

Chapter 13 Aggregate Supply

1 Four Models of Aggregate Supply

Aggregate supply equation:

$$Y = \bar{Y} + \alpha (P - P^e)$$

It implies a trade-off between inflation and unemployment.

1.1 The Sticky Wage Model

Assumption: Nominal wages are sticky in the short run.

1. A rise in the price level lowers the real wage, making labor cheaper.
2. The lower real wage induces firms to hire more labor.
3. The additional labor hired produces more output.

Consequently, the aggregate supply curve slopes upward during the time when the nominal wage cannot adjust.

Assume that workers and firms bargain over and agree on the nominal wage

$$W = \omega \times P^e$$

Nominal Wage = Target Real Wage \times Expected Price Level

After the nominal wage has been set and before labor has been hired, firms learn the actual price level P :

$$W/P = \omega \times (P^e/P)$$

Real Wage = Target Real Wage $\times \frac{\text{Expected Price Level}}{\text{Actual Price Level}}$

Assume that employment is determined by the quantity of labor that firms demand:

$$L = L^d(W/P)$$

Workers provide as much labor as the firm demands at the predetermined wage.

Output is determined by

$$Y = F(L)$$

As a result,

$$Y = \bar{Y} + \alpha(P - P^e)$$

1.2 The Worker-Misperception Model

Assumptions:

- Wages can adjust quickly to balance the supply and demand for labor.
- Unexpected movements in the price level influences labor supply because workers temporarily confuses real and nominal wages.

Labor demand side:

$$L^d = L^d(W/P)$$

Labor supply side (new):

$$L^s = L^s(W/P^e)$$

Workers know their nominal wage W , but not the overall price level P .

$$L^s = L^s [(W/P) \times (P/P^e)]$$

If P^e remains the same when P increases, the increase in P/P^e shifts the labor supply curve to the right.

Assume firms are better informed than the workers and recognize the fall in the real wage, so they hire more labor and produce more output.

1.3 The Imperfect Information Model

Assumptions:

- The markets clear.
- Suppliers confuse changes in the overall level of prices with changes in relative prices.

Main ideas:

1. The supplier decides on his production according to the relative price of his product to the aggregate price level.
2. Not knowing the prices of all other goods in the economy, the supplier has to estimate the relative price of his product using the nominal price of his product and his expectation of the overall price level.
3. When the aggregate price level rises unexpectedly, the supplier can mistakenly infer that the relative prices of the goods they produce have risen.
4. He works harder and produces more.

Evidence on imperfect-information model

1.4 The Sticky-Price Model

Assume that $1 - s$ fraction of firms can set the prices of their products: (departure from perfect competition)

$$p = P + a(Y - \bar{Y})$$

The firm's desired price p depends upon

- The overall level of prices P (higher prices higher cost)
- The level of aggregate income Y (higher demand higher marginal cost)

Assume that s fraction of firms set the price

$$p = P^e$$

The overall price level is

$$P = sP^e + (1 - s) \left[P + a(Y - \bar{Y}) \right]$$

Rearrange the above equation

$$P = P^e + [(1 - s) a/s] (Y - \bar{Y})$$

Rearrange again

$$Y = \bar{Y} + \alpha (P - P^e)$$

Contrast to the sticky-wage and worker-misperception models:

shifts in labor demand curve caused by a reduction in aggregate demand

As a result, real wage can be procyclical.

Evidence on the sticky-price model

1.5 Summary and Implications

1. Output deviates from the natural rate \bar{Y} if the price level P deviates from the expected price level P^e .
2. The long-run monetary neutrality and short-run monetary nonneutrality are perfectly compatible.

Figure 13-5, Figure 13-7

2 Inflation, Unemployment, and the Phillips Curve

2.1 Deriving the Phillips Curve From the Aggregate Supply Curve

The Phillips curve states that the inflation rate depends upon three forces:

- Expected inflation
- The deviation of unemployment from the natural rate, called cyclical unemployment
- Supply shocks

The Phillips Curve equation:

$$\pi = \pi^e - \beta (u - u^n) + v$$

or:

Inflation
= Expected Inflation $- \beta \times$ Cyclical Unemployment
+ Supply Shock

2.2 Two Causes of Rising and Falling Inflation

- Demand-pull inflation (caused by the deviation of unemployment from its natural rate)
- Cost-push inflation (caused by adverse supply shock)

2.3 Inflation and Unemployment in the United States

- The 1960s
 - The tax cut of 1964
 - Expansionary monetary policy
 - An increase in government spending for the Vietnam War
- The 1970s
 - Nixon price controls
 - Contractionary monetary policy
 - Oil price shock in late 1973 and late 1970s

- The 1980s

- Fed aimed at reducing inflation under Paul Volcker
- High unemployment rate in 1982, 1983
- A fall in oil price in 1986
- Inflation picked up in 1989 and early 1990.

- The 1990s

- Fed tightened the monetary policy under Greenspan
- Recession following Iraqi invasion of Kuwait
- Disappearance of the Phillips curve!!

2.4 What happened to the Phillips Curve?

1. Has the natural rate of unemployment suddenly decreased?
2. Are we in the kind of new economy?

2.5 A Painless Disinflation

Under a credible policy, the costs of reducing inflation may be much lower.

Rational expectation versus adaptive expectation